WHAT IS CLAIMED IS:

1. An artificial vascular graft comprising a synthetic tubular element having a luminal surface being coated with a plurality of endothelial cells being genetically transformed to express at least one endothelial cell proliferating growth factor and at least one cellular adherence factor.

2. The artificial vascular graft of claim 1, wherein a first portion of said plurality of endothelial cells is genetically transformed to express said at least one endothelial cell proliferating growth factor and further wherein a second portion of said plurality of endothelial cells is genetically transformed to express said at least one cellular adherence factor.

3. The artificial vascular graft of claim 1, wherein said luminal surface is of a substance selected from the group consisting of polytetrafluoroethylene (PTFE), expanded polytetrafluoroethylene (ePTFE), polyester fibers, Dacron and processed animal blood vessels.

4. The artificial vascular graft of claim 1, wherein said synthetic tubular element is of an inner cross sectional area which is substantially equivalent to an inner cross sectional area of a blood vessel.

5. The artificial vascular graft of claim 4, wherein said inner cross sectional area of said synthetic tubular element is within a range of about 7 to 700 mm^2.

6. The artificial vascular graft of claim 1, wherein said plurality of endothelial cells are derived from a source selected from the group consisting of a segment of a vein, bone marrow progenitor cells, peripheral blood stem cells and circulating endothelial cells.

7. The artificial vascular graft of claim 1, wherein said plurality of endothelial cells are derived from a recipient of the artificial vascular graft.

8. The artificial vascular graft of claim 1, wherein said plurality of endothelial cells are derived from a human or an animal donor.

9. The artificial vascular graft of claim 1, wherein said plurality of endothelial cells form a confluent monolayer at said inner luminal

surface.

10. The artificial vascular graft of claim 1, wherein said at least one endothelial cell proliferating growth factor is selected from the group consisting of VEGF, acidic or basic FGF and HGF.

11. The artificial vascular graft of claim 1, wherein said at least one cellular adherence factor is DANCE or UP50.

12. The artificial vascular graft of claim 1, wherein said plurality of endothelial cells are further genetically transformed to express at least one marker polypeptide.

13. A transformed endothelial cell being genetically transformed to express at least one endothelial cell proliferating growth factor and at least one cellular adherence factor.

14. The transformed endothelial cell of claim 13, being further genetically transformed to express at least one marker polypeptide.

15. The transformed endothelial cell of claim 13, wherein said endothelial cell is derived from a source selected from the group consisting of a segment of a vein, and bone marrow progenitor cells, peripheral blood stem cells and circulating endothelial cells.

16. The transformed endothelial cell of claim 13, wherein said endothelial cell is derived from a source selected from the group

consisting of a human donor and an animal source.

17. The transformed endothelial cell of claim 13, wherein said cellular proliferating growth factor is selected from the group consisting of VEGF, acidic or basic FGF and HGF.

18. The transformed endothelial cell of claim 13, wherein said cellular adherence factor is DANCE or UP50.

19. A method of producing an artificial vascular graft, the method comprising the steps of:

(a) genetically transforming endothelial cells to express at least one endothelial cell proliferating growth factor and at least one cellular adherence factor; and

(b) culturing said endothelial cells within a synthetic tubular element having a luminal surface until sufficient endothelialization of said luminal surface is achieved.

20. The method of claim 19, wherein step (a) is effected by genetically transforming a first portion of said endothelial cells to express said at least one endothelial cell proliferating growth factor and genetically transforming a second portion of said endothelial cells to express said at least one cellular adherence factor.

21. The method of claim 19, wherein said step (a) precedes said step (b).

22. The method of claim 19, wherein said step (b) precedes said step (a).

23. The method of claim 19, wherein said endothelial cells are derived from a source selected from the group consisting of a segment of a vein, and bone marrow progenitor cells, peripheral blood stem cells and circulating endothelial cells.

24. The method of claim 19, further comprising the step of subjecting said luminal surface of said artificial graft to flow forces.

25. The method of claim 19, wherein said artificial graft is used in bypass surgery.

26. A nucleic acid expression construct comprising:

(a) a first polynucleotide segment encoding an endothelial cell proliferating growth factor; and

(b) a second polynucleotide segment encoding cellular adherence factor.

27. The nucleic acid expression construct of claim 26, further comprising at least one promoter sequence being for directing the expression of at least one of said first and said second polynucleotide segments.

28. The nucleic acid construct of claim 27, wherein said first polynucleotide segment is transcriptionally linked to said second

polynucleotide segment whereas said first and said second polynucleotide segment are under the transcriptional control of a single promoter sequence of said at least one promoter sequence.

29. The nucleic acid construct of claim 28, further comprising a linker sequence being interposed between said first and said second polynucleotide segments.

30. The nucleic acid construct of claim 29, where said linker sequence is selected from the group consisting of IRES and a protease cleavage recognition site.

31. The nucleic acid expression construct of claim 26, wherein said at least one promoter is functional in eukaryotic cells.

32. The nucleic acid expression construct of claim 26, wherein said at least one promoter is selected from the group consisting of a constitutive promoter, an inducible promoter and a tissue specific promoter.

33. The nucleic acid expression construct of claim 26, further comprising:

(c) a first promoter sequence being for directing the expression of said first polynucleotide segment; and

(d) a second promoter sequence being for directing the expression of said second polynucleotide segment.

34. The nucleic acid expression construct of claim 33, wherein said first promoter and said second promoter are selected from the group consisting of a constitutive promoter, an inducible promoter and a tissue specific promoter.

35. The nucleic acid expression construct of claim 34, wherein said inducible promoter are regulatable by same effector molecule.

36. The nucleic acid expression construct of claim 26, further comprising at least one additional polynucleotide segment encoding a marker polypeptide.

37. The nucleic acid expression construct of claim 36, wherein said marker polypeptide is selected from the group consisting of a

selection polypeptide and a reporter polypeptide.

38. The nucleic acid expression construct of claim 36, wherein said at least one additional polynucleotide segment is transcriptionally linked to said at least one of said first and said second polynucleotide segments.

39. The nucleic acid construct of claim 36, wherein said at least one additional polynucleotide segment is transcriptionally linked to said at least one of said first and said second polynucleotide segments via linker segment.

40. The nucleic acid construct of claim 39, wherein said linker sequence is selected from the group consisting of IRES and a protease

cleavage recognition site.

41. The nucleic acid construct of claim 36, wherein said at least one additional polynucleotide segment is translationally fused to at least one of said first and said second polynucleotide segments.

42. A nucleic acid expression construct system comprising:

(a) a first nucleic acid expression construct including a first polynucleotide segment encoding an endothelial cell proliferating growth factor; and

(b) a second nucleic acid expression construct including a second polynucleotide segment encoding cellular adherence factor.

43. The nucleic acid expression construct system of claim 42, wherein at least one of said first and said second nucleic acid expression constructs further including at least one additional polynucleotide segment encoding a marker polypeptide.

44. The nucleic acid expression construct system of claim 42, further comprising at least one promoter sequence being for directing expression of at least one of said first and said second polynucleotide segment.

45. The nucleic acid expression construct system of claim 42, wherein said at least one promoter sequence is functional in eukaryotic cells.

46. The nucleic acid expression construct system of claim 42, wherein said at least one promoter sequence is selected from the group consisting of a constitutive promoter, an inducible promoter and a tissue specific promoter.

47. The nucleic acid expression constructs system of claim 43, wherein said marker polypeptide is selected from the group consisting of a selection polypeptide and a reporter polypeptide.

48. The nucleic acid expression constructs system of claim 43, wherein said at least one additional polynucleotide segment is transcriptionally linked to at least one of said first and said second polynucleotide segments.

49. A kit comprising a stand for engaging at least one tube, said at least one tube including a nucleic acid expression constructs system, said nucleic acid expression construct system including:

(a) a first nucleic acid expression construct including a first polynucleotide encoding an endothelial cell proliferating growth factor; and

(b) a second nucleic acid expression construct including a second polynucleotide encoding cellular adherence factor.

50. A kit comprising a stand for engaging at least one tube, said at least one tube including a nucleic acid expression construct, said nucleic acid expression construct including:

(a) a first polynucleotide encoding an endothelial cell proliferating growth factor; and

(b) a second polynucleotide encoding cellular adherence factor.

51. A method of producing genetically transformed endothelial cells, the method comprising the steps of:

(a) obtaining endothelial cells from a source selected from the group consisting of a segment of a vein, and bone marrow progenitor cells; and

(b) transforming said endothelial cells to express at least one endothelial cell proliferating growth factor and at least one cellular adherence factor concurrently.

52. A method of replacing or bypassing at least a portion of a vascular system of an individual, the method comprising the step of implanting into the vascular system of the individual an artificial vascular graft, so as to form a fluid communication between the vascular system and said artificial vascular graft, said artificial vascular graft including a synthetic tubular element having a luminal surface being coated with a plurality of endothelial cells being genetically transformed to express at least one endothelial cell proliferating growth factor and at least one cellular adherence factor.

53. The method of claim 52, wherein a first portion of said plurality of endothelial cells is genetically transformed to express said at least one endothelial cell proliferating growth factor and further wherein a second portion of said plurality of endothelial cells is genetically

transformed to express said at least one cellular adherence factor.

54. The artificial vascular graft of claim 52, wherein said synthetic tubular element is of an inner cross sectional area which is substantially equivalent to an inner cross sectional area of a blood vessel

55. The artificial vascular graft of claim 54, wherein said inner cross sectional area of said synthetic tubular element is within a range of about 7 to 700 mm^2.